Albany South End Community Air Quality Screening

New York State
Department of Environmental Conservation

Division of Air Resources
August 14, 2014

In response to community air quality concerns, the New York State Department of Environmental Conservation met with Albany South End community leaders on several occasions and developed an air screening plan for their neighborhood. The air quality analysis conducted by NYSDEC's Division of Air Resources found no unusual results in this community.

Executive Summary

Residents living near the Port of Albany, in the Albany South End community, have voiced concern about potential air quality impacts due to the movement and storage of crude oil in the area. Residents asked the New York State Department of Environmental Conservation (NYSDEC) to perform a survey of air quality in the area and NYSDEC agreed to conduct air sampling.

NYSDEC staff met with residents in the community and designed a short-term air quality survey to address the community's concerns. NYSDEC staff explained that the area has many sources of air contaminants including those from the Kenwood rail yard as well as from manufacturing sources, industry, local residential and commercial space heating and from mobile sources on nearby Interstate-787 and other roadways. The scope of the survey is limited and wasn't designed to use the data for enforcement or compliance purposes, or for identifying source-specific ambient air contributions. NYSDEC planned to compare the results to applicable health-based air concentration values and, if unusual values were found, would consider follow-up activities at specific facilities or additional air quality monitoring.

The design of the survey included 1 hour samples collected simultaneously at three locations in the Albany South End community on five separate days. In addition, a community volunteer collected a sample on six days. While NYSDEC collected samples when meteorological conditions favored potentially high air contaminant concentrations, the samples collected by the community volunteer targeted instances of public complaints and odor episodes.

NYSDEC's laboratory analyzed all samples for a suite of air contaminants known as Volatile Organic Compounds (VOCs). These types of air contaminants volatilize readily into the atmosphere and are part of the composition of crude oil and petroleum products. Additionally, NYSDEC analyzed the samples for specific light-weight alkanes which have been identified as components of crude oil originating from the North Dakota and Saskatchewan Bakken formation.[1]

NYSDEC survey found the concentrations for VOCs and light-weight alkanes from all of the samples are below NYSDEC's short-term health-based air concentration values and most are below the long-term health-based air concentration values. Additionally, the results are similar to concentrations routinely found at other locations in the State.

In May, the U.S. Environmental Protection Agency (USEPA) collected air samples onsite at the Global and Buckeye petroleum storage and transfer terminals and one air sample in the Albany South End neighborhood. USEPA collected short duration air samples, approximately 20 seconds, with similar equipment to what NYSDEC used in its sample collection. USEPA evaluated the air samples for 79 individual constituents, including VOCs that are part of the composition of crude oil and light-weight

[1] *Safety debate eyes taming Bakken Crude before it hits rails*. Thomas Reuters news, posted May 12, 2014. Available online at: http://www.reuters.com/article/2014/05/12/us-davegrailways-safety-crude-analysis-idUSKBN0DS18620140512. Accessed 7/2/2014.

alkanes. For the neighborhood sample, the constituents commonly found in crude oil and petroleum products were found to be similar to concentrations in this screening assessment and concentrations routinely found at other locations in the State.

In conclusion, none of the concentrations of toxic air contaminants are considered to be of immediate public health concern and all concentrations are similar to what is measured in other locations of the State.

Background

Community Concerns

Residents living near the Port of Albany, in the Albany South End community, have voiced concern about potential air quality impacts due to the movement and storage of crude oil in the area. The production of crude oil from the Bakken formation in North Dakota and Saskatchewan has created a need for rail transportation of crude oil to seaports where it can be transported to refineries on the east coast. The Global and Buckeye petroleum storage and transfer terminals in the Port of Albany use their facilities to unload crude oil from rail cars, store it in tanks, and load it onto barges, for shipment down the Hudson River. These two facilities also store and transfer other petroleum products, e.g. gasoline and fuel oil.

NYSDEC issues permits to facility owners whose operations trigger applicable regulations for the storage and distribution of petroleum products. These State and federal regulations are designed to ensure potential emissions of air contaminants do not adversely impact the area. Major oil storage facilities also are required by State regulations to obtain a license to operate, and must employ equipment and procedures to prevent spills, provide secondary containment to capture spills, employ equipment and procedures to detect leaks, and regularly inspect the facility to ensure that equipment is in good operating order. NYSDEC has no jurisdiction over the means and methods of transportation to and from the facilities, including the trains, trucks and barges. The U.S. Department of Transportation (the Federal Railroad Administration and the Pipeline and Hazardous Materials Safety Administration) implements regulations targeting locomotive emissions and the safe movement of rail cars. The New York State Department of Transportation (NYSDOT) also regulates track safety in New York.

Concerned residents asked NYSDEC to perform a survey of air quality in their neighborhood.

Community Description

The sampling area includes the neighborhoods of Albany South End, Mount Hope and Krank Park – Cherry Hill.[2] All three neighborhoods are considered potential environmental justice areas following NYSDEC's guidance for identifying these areas.[3] These neighborhoods lie adjacent to Interstate-787 which is the main highway for travel into and out of downtown Albany. The stretch of Interstate-787 that crosses South Pearl Street has an annual average daily traffic count of 58,172 vehicles.[4]

The area is a mixture of industrial uses in the Port of Albany and west and north of the Port are residences, commercial entities and small businesses. Interspersed in the community are parks and community service facilities (e.g., schools, churches, historic properties). There are a few solid waste management operations located in the Port such as a solid waste transfer station, a construction and demolition debris processing operation and a recyclables handling and recovery facility. There are five major oil storage facilities on the Albany side of the Hudson River and seven on the Rensselaer side of the river. The facility closest to the Albany South End neighborhood is the Global Companies LLC facility. Two facilities (Global Companies LLC and Buckeye Albany Terminal LLC) in the Port have the most comprehensive level of air permitting, a Title V permit.[5] In terms of air permitting, other facilities (asphalt, flour milling and wastewater treatment) or operations in the area hold a Registration permit or Certificate to Operate. The operations at the Port of Albany also include a large rail yard.

The population density for the area is 2,750 people per square mile.[6] For the purpose of comparison to other air monitoring locations in the State, the area will be characterized as urban.[7,8] Most people, 28.5% are employed in the sectors of educational services, health care and social assistance. Retail trade employs 15.7%. The third largest sector, considered other services[9] (not classified elsewhere), employs 10.1%.[10]

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[2] For ease of discussion, the area will be referenced as Albany South End.
[3] NYSDEC Environmental Justice Policy CP-29, March 19, 2003. The guidance can be found here: http://www.dec.ny.gov/public/911.html.
[4] New York State Department of Transportation, 2012 Traffic Volume Report. The section of Interstate-787 referenced is noted by marker: 787I11011016.
[5] To learn more about the permitting of facilities by NYSDEC, read *The Development of the State Program* in Appendix A – Controlling Sources of Toxic Air Contaminants.
[6] Estimates from census tract 36001002600 were used, based on 2010 census data.
[7] Comparison to other locations in the State can be found in the *Results* section.
[8] The US Census has formal criteria for selecting urban and rural locations. In general, the Census classifies areas with more than 500 persons per square mile as an urban location. Federal Register, Vol. 76, No. 164, Department of Commerce, Urban Area Criteria for the 2010 Census. August 24, 2011
[9] Example services in this category include equipment and machinery repairing, promoting or administering religious activities, grant making, advocacy, and providing dry cleaning and laundry services, personal care services, death care services, pet care services and photofinishing services.
[10] U.S. Census Bureau – Selected Economic Characteristics, 2006 – 2010 American Community Survey 5-Year Estimates. Accessed online 10/1/2012 at : http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t

Community Meetings

On March 21, 2014, NYSDEC met with members of the community and staff from the Albany County Health Department to begin discussions about air sampling in the Albany South End community. Discussions focused on the selection of air contaminants for analysis and locations for sampling. The community and Dr. David Carpenter[11] raised concerns about ambient concentrations of hydrogen sulfide and formaldehyde. Additionally, the community asked for sampling equipment to obtain its own sample following the protocol of NYSDEC's Community Air Screen (CAS) Program.[12] Over the next month, NYSDEC staff continued discussions with stakeholders on the screening plan.

On April 29, 2014, NYSDEC staff presented and received input on the draft Albany South End Community Air Quality Screening plan at a community meeting in the Ezra Prentice Homes. In addition to community members and other stakeholders, staff from the Albany County Health Department attended. The screening plan documented the selection of air contaminants and the three neighborhood sample locations. It also detailed the deployment of sampling equipment to be used at the community's discretion with the goal of sampling during periods of concern such as odor episodes. Included in the screening plan was information on how the sample results would be interpreted and the limitations and uncertainties of this type of short-term sample collection. Finally, the screening plan emphasized that the initial focus will screen current local air quality from existing sources.

During the community meeting, NYSDEC staff announced their intent to perform baseline measurements of hydrogen sulfide and formaldehyde. Staff emphasized that this effort would be considered separate from the community air screen since delays with equipment purchasing may deter the start of the air screening. It was agreed that the information collected on these two contaminants may be helpful to determine if potential changes in crude oil composition have a measurable impact on ambient concentrations.

The draft screening plan became final and staff began collecting samples on May 8. The community obtained its first sample on April 28.

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[11] Dr. Carpenter expressed concern that hydrogen sulfide and formaldehyde were present in high concentrations during the extraction of crude oil. He asked NYSDEC to monitor current, local concentrations of these two air contaminants.

[12] For more information about the Community Air Screen Program, visit: http://www.dec.ny.gov/public/81629.html

NYSDEC and Community Sampling

Selection of Air Contaminants

NYSDEC met with residents from the Albany South End community on several occasions to obtain their input during development of the community air quality screening plan. Residents in the area specifically asked that sampling efforts focus on the crude oil handling operations at the Port of Albany. NYSDEC selected specific air contaminants that are known as Volatile Organic Compounds (VOCs). These types of air contaminants volatilize readily into the atmosphere and are constituents of crude oil. VOCs are commonly found in air throughout the State because they are released from many sources such as industrial sources, motor vehicles and residential space heating. Since there are many sources of VOCs, it was anticipated that these compounds would be detected in all samples collected.

In addition to VOCs, NYSDEC considered air monitoring for fine particulate matter[13] ($PM_{2.5}$) but determined it was unwarranted as NYSDEC currently monitors for $PM_{2.5}$ in the neighborhood at the Albany County Health Department (175 Green Street). This monitor shows that the $PM_{2.5}$ concentrations in the area are below health-based National Ambient Air Quality Standards (NAAQS) and lower in comparison to other urban areas in the State, see Figure 1.

[13] These particles are less than 2.5 microns in diameter. By comparison, human hair diameters range from 40 to 120 microns.

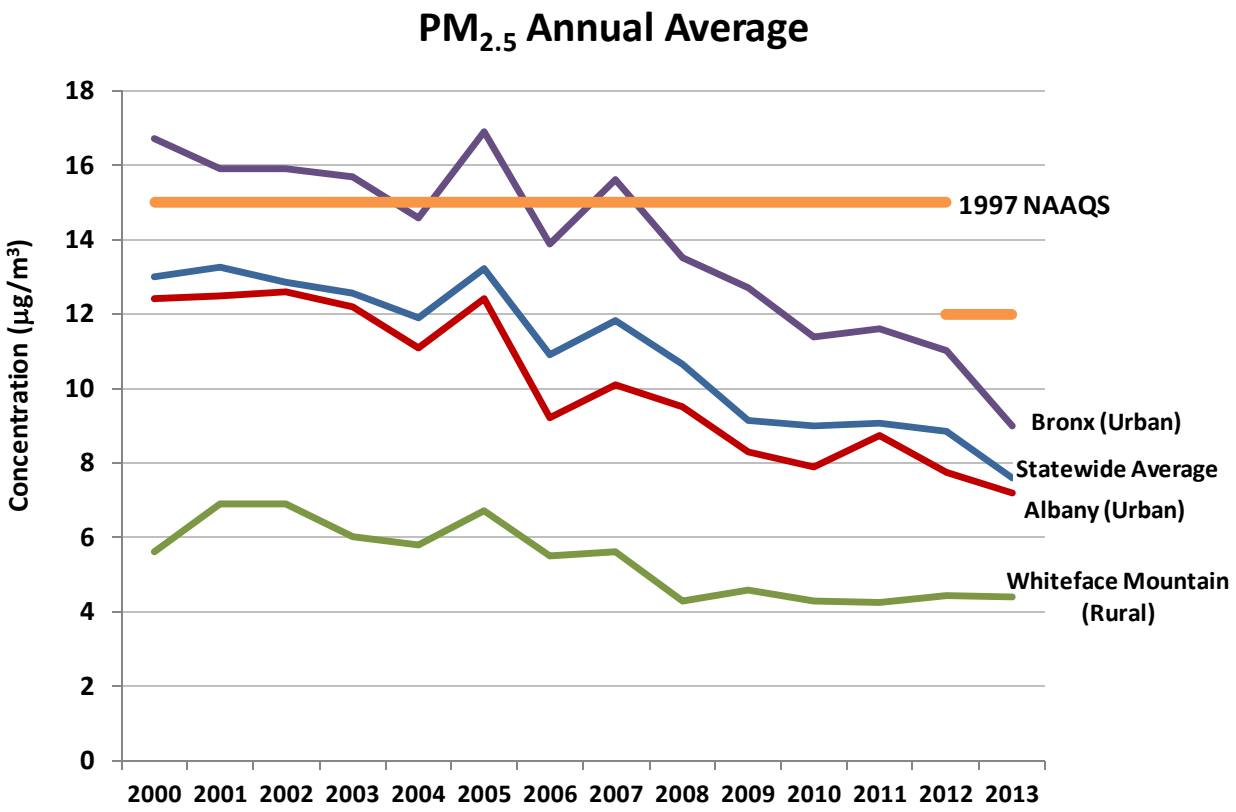

Figure 1. Annual Average $PM_{2.5}$ Concentrations from Albany and Other Representative Monitors

Selection of Light-Weight Alkanes

In addition to VOCs, NYSDEC included analysis of specific light-weight alkanes that have been identified as components of crude oil originating from the Bakken formation.[14] These compounds are sometimes referred to as natural gas liquids (NGLs) and potentially increase the flammability of crude oil. The light-weight alkanes[15] evaluated in this screening assessment were butane, hexane, isobutane, isopentane, pentane and propane. At ambient temperature and pressure, those in the liquid state readily volatilize.[16] Recent concern over the volatility and flammability of crude oil has led to the reporting of light-weight alkanes by some companies transporting crude oil by rail.[17] This information and other

[14] *Safety debate eyes taming Bakken Crude before it hits rails*. Thomas Reuters news, posted May 12, 2014. Available online at: http://www.reuters.com/article/2014/05/12/us-davegrailways-safety-crude-analysis-idUSKBN0DS18620140512. Accessed 7/2/2014.

[15] Alkanes are composed exclusively of carbon and hydrogen atoms. NGLs are sometimes called 'light ends' because they are lower weight alkanes, comprised of two-five carbon alkanes.

[16] Butane, isobutane and propane are gases at ambient temperature and pressure.

[17] Pipeline and Hazardous Materials Safety Administration (PHMSA), Call to Action lists companies which have voluntarily submitted testing data to the US Department of Transportation. The information shared consists of data gathered from samples of petroleum crude oil from the Bakken region. Among the parameters tested is information

parameters are used to classify crude oil during rail transport to ensure that the appropriate hazard classification has been placed on railcars.[18] Alkanes in general, and in particular light-weight alkanes, are not considered to be toxic in concentrations found in ambient air but they are an air quality concern because they contribute to ozone formation. NYSDEC monitors for these ozone precursors to evaluate and modify control strategies for sources.[19]

Light-weight alkanes were included in this screening assessment to provide an evaluation of constituents of Bakken crude oil and to assess their relative impacts on the community. Although this screening assessment cannot be used to identify source-specific ambient air impact contributions, the concentrations of the light-weight alkanes can be used to help differentiate the impact of source categories in the area including evaporative emissions from oil handling facilities and the emissions from vehicles on Interstate-787 and other local roadways.

Sampling Locations

NYSDEC worked with community residents to find suitable sampling locations. Factors considered included proximity of residents to the nearby crude oil storage and transfer facilities (Global and Buckeye terminals), location of other sources (such as Interstate-787), local meteorological conditions and publicly accessible locations (such as parks and playgrounds). Winds are predominantly from the south. With these considerations in mind, NYSDEC selected three suitable locations as shown in Figure 2.

The playground in the Ezra Prentice Housing Complex represents the closest residences to the crude oil storage and transfer operations. Krank Park in Cherry Hill is located near an elementary school. Collection of samples at this location provided air screening information in close proximity to an area where children spend time outdoors. An open lot at the corner of Gansevoort and Franklin Streets was selected as it is often directly downwind of the storage and transfer operations.

The community collected six samples in various neighborhood locations. The primary target for sample collection was detection of petroleum odors in the neighborhood. Community residents notified the community's volunteer sampler during odor episodes and he collected a sample. In the absence of odors, favorable meteorological conditions such as light winds from the east and south and warm temperatures determined the suitability of conditions for sample collection.

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on the chemical breakdown of light ends. PHMSA, Call to Action, available online at: http://www.phmsa.dot.gov/hazmat/osd/calltoaction. Accessed 7/2/14.

[18] United States Department of Transportation. Docket No. DOT_OST-2014-0025. Amended and Restated Emergency Restriction/Prohibition Order. March 6, 2014. Anthony R. Fox, Secretary of Transportation.

[19] More information about NYSDEC's Photochemical Assessment Monitoring Stations monitoring can be found in the 2014 Monitoring Network Plan which is available online at: http://www.dec.ny.gov/chemical/54358.html.

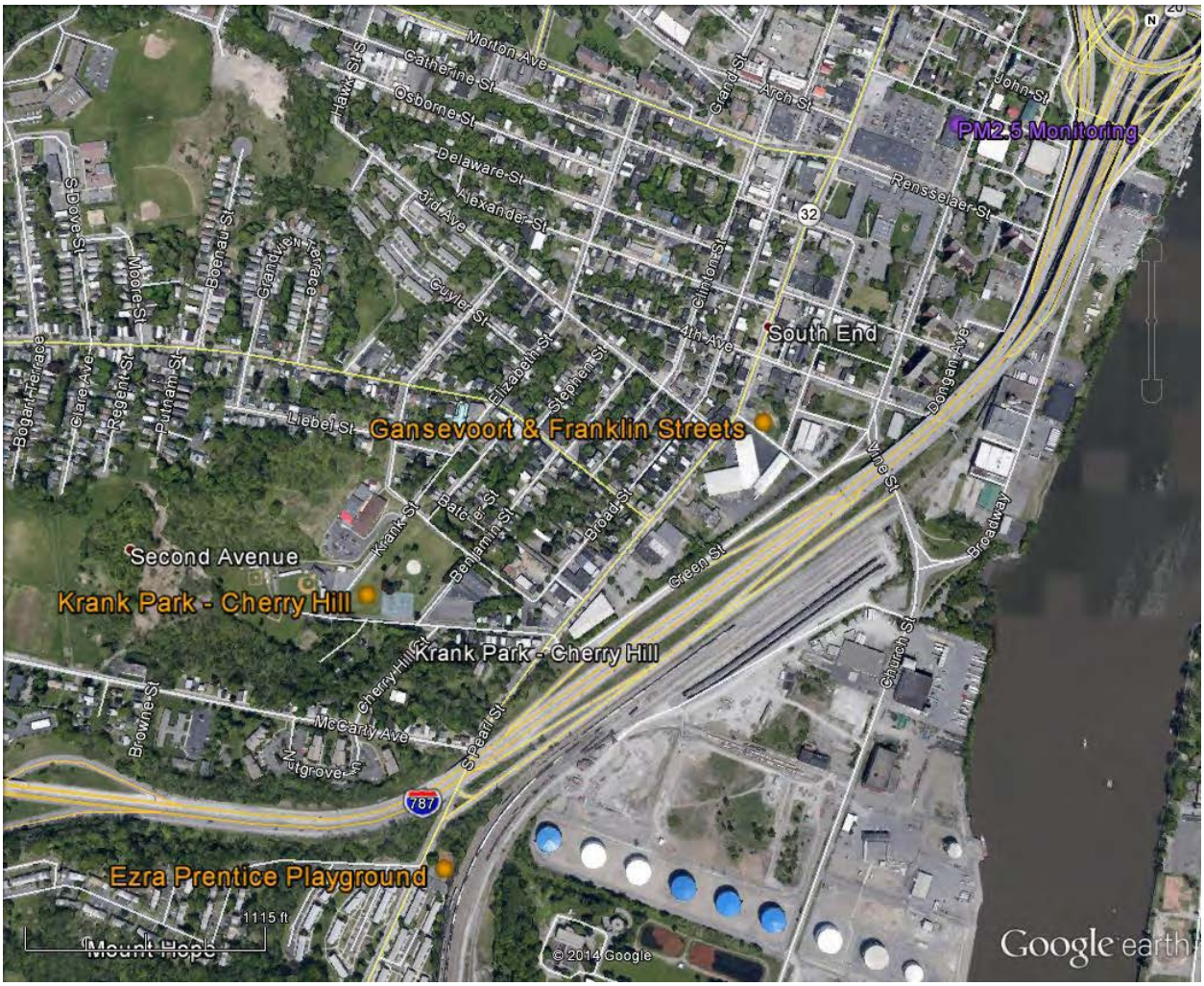

Figure 2. Map of NYSDEC Sampling Locations and existing $PM_{2.5}$ Monitor

Meteorological Information

NYSDEC established a temporary meteorological monitoring site at the Albany Wastewater treatment plant on Church Street. The portable 10 meter tower was located less than 100 meters from the southern edge of the Global facility property line. A Climatronics All-in-One Sensor (Serial Number 678) collected the data within the period in which the sensor was certified for use by the manufacturer.

The relevant meteorological conditions during each of the 11 sampling events are shown in Table 1. Windrose plots illustrating the wind direction and speed for the 1 hour samples collected by the community and NYSDEC are shown in Appendix B.

Table 1. Meteorological Conditions during Community and NYSDEC Sampling Periods (1 hour)

Date	Start Time	Temp (degrees Fahrenheit)	Humidity (%)	Wind Direction[a]	Wind Speed (miles per hour)
28-Apr-14	2:50 PM	60	38	East	7.6
8-May-14	1:50 PM	69	53	South	8.0
10-May-14	11:43 AM	75	68	South	6.0
12-May-14	10:00 AM	77	28	South	4.9
20-May-14	2:59 PM	74	29	East	4.6
21-May-14	11:00 AM	74	27	South southwest	6.7
29-May-14	2:00 PM	70	41	South southeast	5.5
29-May-14	3:28 PM	70	40	South	6.3
2-Jun-14	8:10 AM	68	56	South	6.2
17-Jun-14	3:05 PM	88	49	South	6.0
6-Jul-14	4:29 PM	85	40	South	5.2

[a] Direction wind is blowing from.

For all sampling events, winds from the south or east were present which placed most of the sampling locations downwind from the sources of interest in the Port of Albany. In addition to favorable wind direction, periods of low to moderate wind speeds also were present. During seven sampling events, the average temperature during the hour of sampling was higher than normal expected temperatures based on historical data as shown in Figure 3.

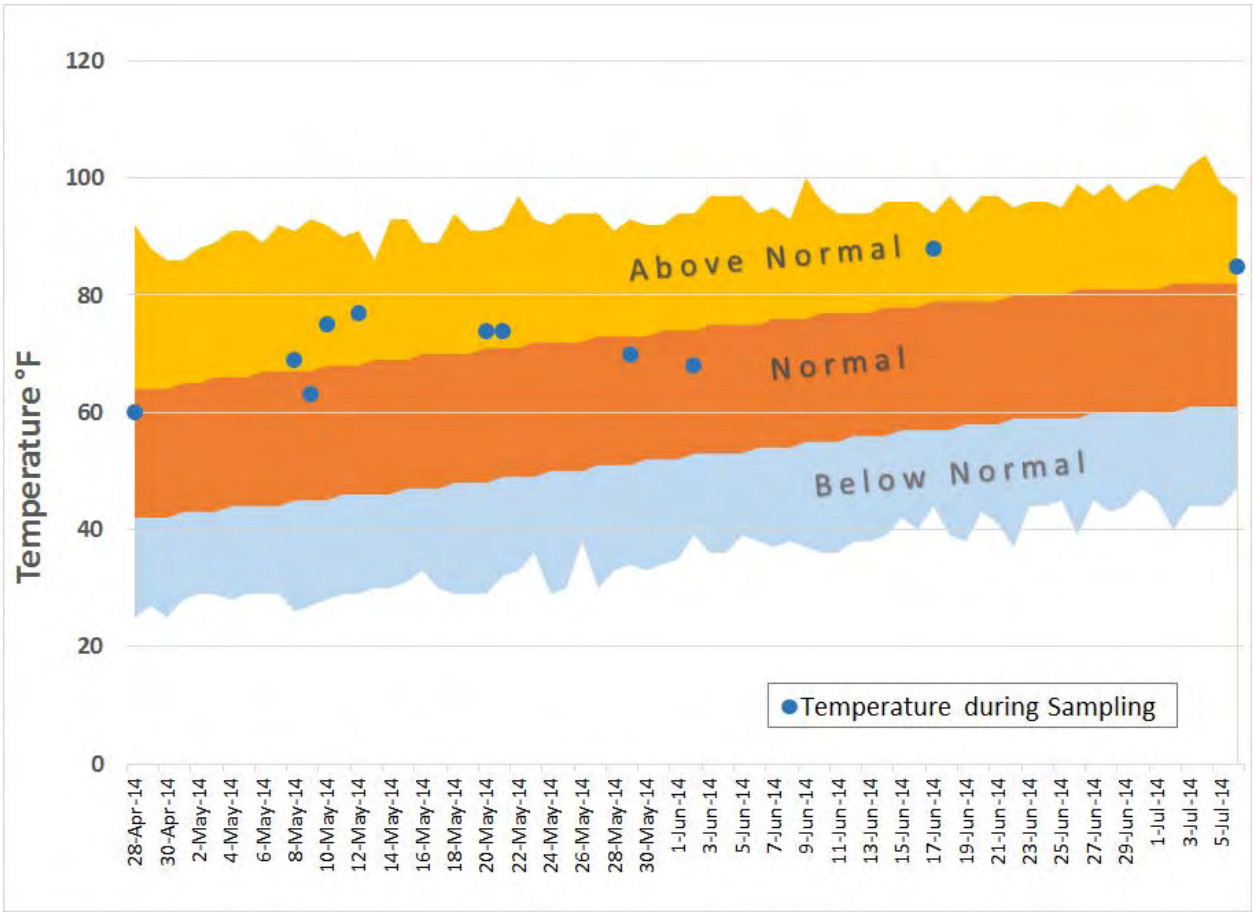

Figure 3. Temperatures for Albany, NY and Observed Temperatures from Meteorological Station in Port of Albany.[20]

[20] Data source, National Weather Service from meteorological station at the Albany Airport. The daily normal and record temperatures calculated from 1981 to 2010 observations.

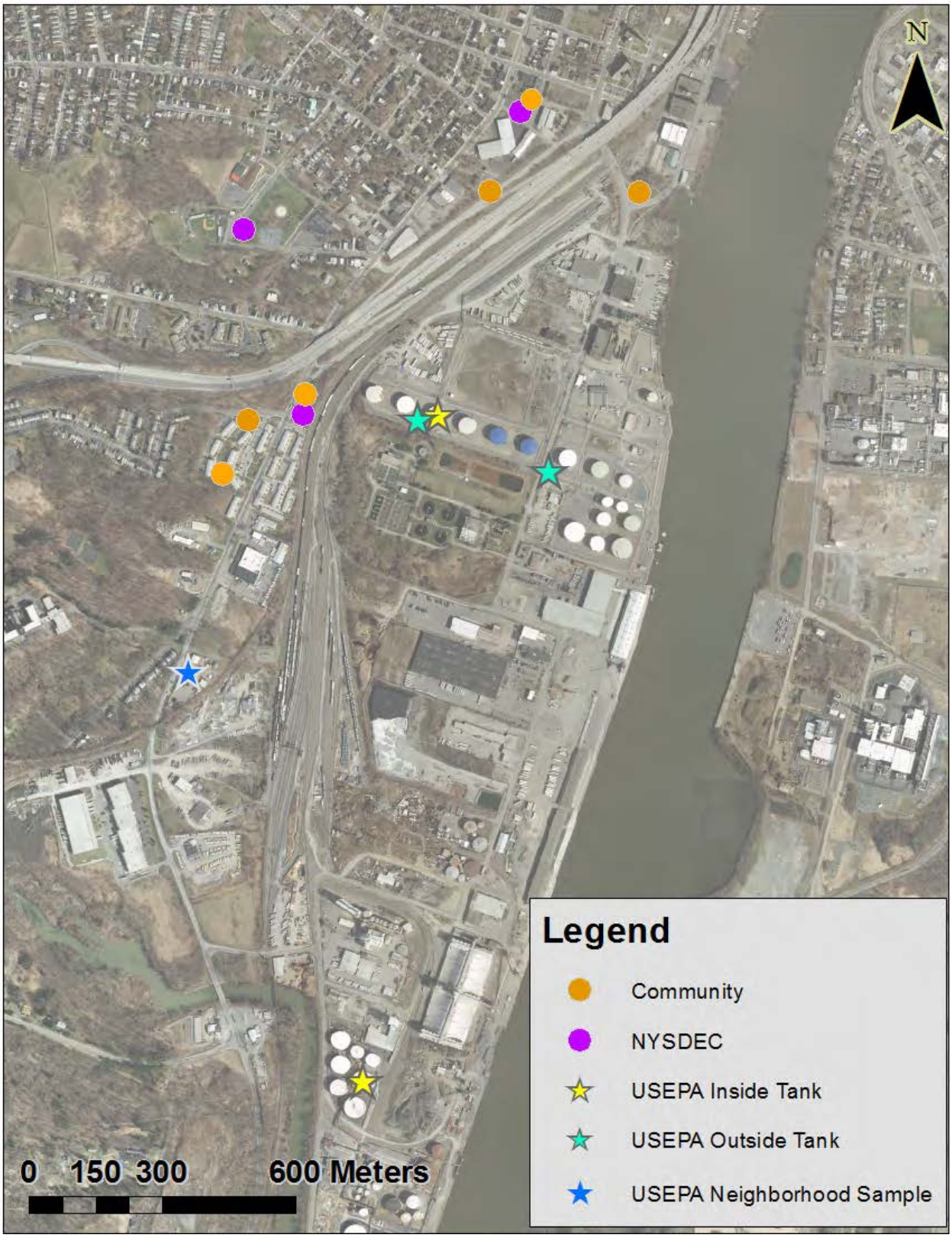

Figure 4. Locations for Samples Collected by the Community, NYSDEC and U.S. Environmental Protection Agency

Sample Collection

NYSDEC and the community volunteer collected samples between April 28 and July 6, 2014. NYSDEC selected this time period because the community requested that sampling begin as early as possible but also requested that sampling occur in the summer when evaporative emissions are higher. All air samples were collected for 1 hour using an evacuated 6-liter SUMMA canister with a calibrated, flow controlled inlet.

NYSDEC collected three samples simultaneously for an hour. The purpose for simultaneous collections was to attempt to distinguish between sources close to the neighborhood versus city-wide sources. Sample dates and times were determined based on meteorological forecasts for rain, temperature, and wind speed and direction. Working with meteorological staff at NYSDEC, forecasts for conditions including high temperatures, low wind speeds and winds from the south and southeast were targeted for sample collection. The last sample collected by NYSDEC on June 2 targeted the emissions from morning rush hour on Interstate-787 and other local roadways.

The community volunteer collected six air samples, from late April to early July, with the same equipment used by NYSDEC staff to collect samples. The locations for the samples are shown in Figure 4. The community samples were obtained in publicly accessible locations near the Port of Albany operations targeting odor episodes or favorable meteorological conditions. The number of odor episodes experienced during the sampling period was fewer than anticipated, and only three of six samples were collected when odors were present. The last sample, taken on July 6 during an odor episode, was collected at Gansevoort and Franklin Streets where the community representative determined that odors were most pronounced after investigating other locations in the neighborhood.

During sample collection, both staff and the community volunteer followed identical protocols and completed a field log that documented a chain of custody for the sampling canister and recorded information on sampling location, pressure gauge readings, sampling time and weather conditions. Noticeable activities at the sample location that might influence the collected sample were recorded along with the presence or absence of odors. Additional information about potential non-target sources was recorded on the field log, such as nearby construction equipment and idling vehicles. All field logs are included in Appendix C.[21]

When possible, photos of the Kenwood rail yard were obtained from NYSDOT's traffic monitoring cameras during the period of sample collection. NYSDOT operates a network of cameras along certain roadways to monitor and collect information on traffic conditions.[22] The view of the camera along Interstate-787 at the Port of Albany exit, although focused on highway traffic, does include a portion of the Kenwood rail yard. As shown in Appendix D, during sampling on May 12, May 21 and May 29, many railcars were present in the yard. Sampling on June 2 took place during the morning commute and the heavier traffic into Albany is noticeable in the image for that date.

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[21] Personal information has been removed from the field logs.
[22] NYSDOT does not maintain historical images of traffic from these cameras.

NYSDEC based dates and times for sample collections on information and criteria to predict when VOC concentrations were expected to be highest in the community. No information was available concerning the actual loading and unloading activities at the crude oil handling operations for the sample collection periods. Additionally, the dates and times for the sample collections were not provided to the crude oil handling facilities before the samples were collected.

Sample Analysis

After each sample collection, all canisters were returned to NYSDEC's Bureau of Air Quality Surveillance laboratory for analysis using gas chromatography/mass spectrometry (GC/MS).

NYSDEC analyzed the canisters for 43 target compounds (shown in Table 2) by USEPA's method TO-15. These compounds are consistent with the list of compounds reported by NYSDEC's Air Toxics Monitoring Network. The analytical process is briefly described as follows: A portion of the air sample is taken from the canister at a controlled flow and temperature by an Entech Model 7100A preconcentrator, a device designed to take a dilute trace of a sample and concentrate it. This trace sample is subsequently injected into a Varian Saturn GC/MS.

Table 2. USEPA TO-15 Compounds

Chemical	CAS#[a]	112(k)[b]
1,1,1-Trichloroethane	71-55-6	
1,1,2,2-Tetrachloroethane	79-34-5	X
1,1,2-Trichloroethane	79-00-5	
1,1-Dichloroethane	75-34-3	
1,1-Dichloroethylene	75-35-4	
1,2,4-Trichlorobenzene	120-82-1	
1,2,4-Trimethylbenzene	95-63-6	
1,2-Dibromoethane	106-93-4	
1,2-Dichlorobenzene	95-50-1	
1,2-Dichloroethane	107-06-2	X
1,2-Dichloropropane	78-87-5	X
1,3,5-Trimethylbenzene	108-67-8	
1,3-Butadiene	106-99-0	X
1,3-Dichlorobenzene	541-73-1	
1,4-Dichlorobenzene	106-46-7	
*a*Chlorotoluene	100-44-7	
Benzene	71-43-2	X
Bromodichloromethane	75-27-4	
Bromomethane	74-83-9	
Carbon disulfide	75-15-0	
Carbon tetrachloride	56-23-5	X
Chlorobenzene	108-90-7	
Chloroethane	75-00-3	

Chemical	CAS#[a]	112(k)[b]
Chloroform	67-66-3	X
Chloromethane	74-87-3	
cis-1,3-Dichloropropylene	542-75-6	
Dichlorodifluoromethane	75-71-8	
Dichloromethane	75-09-2	X
Dichlorotetrafluoroethane	76-14-2	
Ethylbenzene	100-41-4	
Hexachloro-1,3-butadiene	87-68-3	
m,p-Xylene	1330-20-7	
Methyl-*tert*-butyl-ether	1634-04-4	
o-Xylene	95-47-6	
Styrene	100-42-5	
Tetrachloroethylene (perchloroethylene)	127-18-4	X
Toluene	108-88-3	
trans-1,2-Dichloroethylene	156-60-5	
trans-1,3-Dichloropropylene	542-75-6	
Trichloroethylene	79-01-6	X
Trichlorofluoromethane	75-69-4	
Trichlorotrifluoroethane	76-13-1	
Vinyl chloride	75-01-4	X

[a] CAS# - chemical abstract number is a unique registry number assigned to each chemical.

[b] These are among the 33 priority hazardous air pollutants listed in Section 112(k) of the 1990 Clean Air Act. These pollutants have been identified by USEPA as posing the greatest threat to public health in urban areas.

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Laboratory and Field Quality Assurance and Quality Control

NYSDEC's laboratory participates in USEPA's National Air Toxics Trends Station program and follows the guidelines outlined in the Technical Assistance Document[23] for quality assurance evaluations. Additionally, USEPA sponsored external performance evaluations are performed twice a year. NYSDEC included a collocated sample collection and replicate analyses of two samples to provide a demonstration that quality assurance procedures were adequate for this study.

Precision refers to agreement between independent measurements performed according to identical protocols and procedures and applies to both sample collection and laboratory analysis. To evaluate laboratory precision, every tenth sample collected was analyzed twice. The first analysis is labeled "primary" and the subsequent analysis of this sample is a "replicate." To evaluate overall sample precision, which includes collection and laboratory analysis, a second SUMMA canister sample was

[23] United States Environmental Protection Agency 2007a. Technical Assistance Document for the National Ambient Air Toxics Trends and Assessment Program. Office of Air Quality Planning and Standards (C304-06), February 28, 2007.

collected in every ten samples. The second sample (called collocated) was handled by field and laboratory personnel using the same equipment and protocols as the primary sample. Both the laboratory and sample precision measurements are evaluated by calculating a percent difference[24] for results obtained at concentrations greater than five times the method detection limit. Comparisons within +/- 25% percent difference are considered acceptable.

NYSDEC prepared two laboratory replicates over the course of analyzing the samples. The first replicate was prepared from the sample collected by NYSDEC staff on May 21 at the Ezra Prentice Playground site. The second replicate was prepared from the June 2 sample collected by NYSDEC staff at Gansevoort and Franklin Streets. NYSDEC staff collected one collocated sample on May 21 at the Ezra Prentice Playground site. The three evaluations are shown in Appendix E. The acceptance threshold for precision was demonstrated across all analysis runs as shown in the Table 1.

Interference was evaluated both in the laboratory and in the field. Laboratory interference (the possibility of contamination due to laboratory handling) is checked by analyzing one blank canister every ten samples. Field interference was assessed by comparing the pressure reading of the canister as recorded on the field log. A pressure check verification is performed on each canister returned to the laboratory prior to laboratory analysis. If the pressure does not match the recorded value on the field log, then air has entered the canister after sample collection and the sample cannot be considered valid. All samples met the criteria for interference checks.

USEPA Sample Collection

On May 6, 8 and 9, 2014, USEPA's Air Enforcement Division collected four air samples onsite at the Global and the Buckeye Albany Terminals located in the Port of Albany and one neighborhood air sample in the South End Neighborhood. All USEPA air samples were short duration collections, approximately 20 seconds, and were collected using 6-liter SUMMA canisters. Two air samples were collected inside crude oil storage tanks (vapor space above the internal floating roof), inside Tank 32 at Buckeye (May 8) and inside Tank 31 (May 6) at Global. USEPA collected samples inserting an 18-inch probe through a minimally opened roof hatch. At the time of sampling, the Buckeye tank was being filled with Bakken crude oil.

Two samples were collected (May 6) at ground level near the containment dike walls outside of Tanks 32 and 39 at the Global Terminal. A hand held Photoionization Detector (PID)[25] was used to locate the area with the highest concentration of total VOCs outside of each tank. The total VOC readings ranged from 8 to 30 parts per billion (ppb). When readings were at the highest level, an air sample was collected with a canister.

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[24] Percent difference is the difference between two measurements divided by the average, expressed as a percent.
[25] A Photoionization Detector was used, capable of detecting total VOCs in the range of parts per billion by volume level. The instrument is an IonScience Phocheck Tiger calibrated with 10 parts per million isobutylene. This instrument is not as selective as gas chromatography used to analyze the samples collected by the SUMMA canisters and therefore, is generally not used to report individual VOCs.

USEPA collected one community sample on May 9, on South Pearl Street. At the time of sampling, 9:16 AM, the winds were from the south-southeast at 8.8 miles per hour. The traffic was moderate on South Pearl Street and the total VOC level was 10 ppb from the PID reading. All USEPA sample locations are shown in Figure 4.

USEPA evaluated the air samples for 79 individual constituents.[26] For this report, only USEPA's neighborhood air sample and analytes considered as constituents of crude oil and in common with NYSDEC's sampling will be discussed.[27] All results can be found in Appendix F, Table 1.[28]

Interpretation of Results

NYSDEC compared the air sample results to health-based concentration values established by NYSDEC. First, NYSDEC compared the measured air concentrations to short-term health-based air concentration values to assess whether the results were of immediate public health concern. Second, NYSDEC compared the results to long-term health-based air concentration values to evaluate the need for follow-up activities such as longer-term sampling and/or enhanced facility inspections. Both the short-term and long-term air concentration values are discussed further below. Next, NYSDEC compared the air sample results to ambient air monitoring concentrations from NYSDEC's air toxics monitoring network, since many of the VOCs assessed are frequently detected at other locations in the State. This comparison evaluates whether the sampling results from this screening are different from air monitoring concentrations at other locations in the State. Finally, NYSDEC compared the results to screening results from NYSDEC's Community Air Screen (CAS) program. CAS is a community-based program that works with volunteers from local communities to screen for toxic air contaminants. CAS samples also were collected over a 1 hour time frame.

What follows are explanations of NYSDEC's health-based air concentration values and a description of NYSDEC's air toxics monitoring network and CAS program.

NYSDEC's Health-based Concentration Values

Many organizations and agencies derive exposure limits to protect workers or the general public from adverse exposures to air contaminants. Each one of these exposure limits requires extensive research and development time. As such, NYSDEC establishes both short-term and long-term air concentration values by adopting the most conservative health-based air concentration values developed by others, such as the USEPA or the New York State Department of Health (NYSDOH). For contaminants where an exposure limit for the general public has not been developed, NYSDEC derived a health-based air concentration value. NYSDEC uses these values as part of its strategy to determine the degree of

[26] The samples were analyzed for the suite of compounds reported by the network of photochemical assessment monitoring for ozone precursors.
[27] 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1,3-butadiene, benzene, butane, ethylbenzene, hexane, isopentane, isobutene, m,p-xylene, o-xylene, pentane, propane, styrene and toluene.
[28] The results have been provided as received by USEPA in the units of parts per billion-carbon.

pollutant removal required for sources releasing air contaminants. These health-based air concentration values are being used in this screening assessment.

First, NYSDEC compared the 1 hour air sample results to short-term health-based air concentration values called Short-term Guideline Concentrations (SGCs) to determine whether the results represent an immediate public health concern. NYSDEC established SGCs to protect the general public from adverse exposure to toxic air contaminants for short-term exposures of 1 hour. The general public includes infants and children, and other individuals who may be susceptible. Examples of health outcomes from short-term exposures may include headaches, nausea, allergic reactions, asthma exacerbation, and irritation to the eyes, nose and throat.

Next, for this screening, NYSDEC compared the 1 hour sample results to long-term health-based air concentration values which are called Annual Guideline Concentrations (AGCs). Comparison of the screening samples to long-term values is a conservative approach and was conducted to determine the need for follow-up activities. AGCs are ambient (for outdoor air) annual-based concentrations that NYSDEC derived to protect the public's health from long-term (e.g., continuous lifetime) exposure to an air contaminant. AGCs are generally compared with air samples obtained from a full year of monitoring or dispersion modeling estimates for annual averages.

There are two health outcomes from long-term exposures - cancer and non-cancer endpoints such as reproductive, development, respiratory and cardiovascular effects. The non-cancer AGC is derived from an air concentration that is not expected to cause health effects during a lifetime of continuous exposure. The AGC air concentration is often modified – to be very conservative - from the experimental value to account for uncertainties such as whether the effects in animals can be used to estimate the likelihood of effects in humans and whether the effects of high exposure concentrations in humans or animals can be used to estimate the effects of low-exposure levels. The non-cancer health endpoints generally require higher exposures to elicit a response when compared to cancer health endpoints.

The other health outcome possible from long-term exposure is cancer. Cancer AGCs are defined as chemical concentrations in air that are associated with an estimated excess lifetime human cancer risk of 1-in-a-million (1×10^{-6}). Under the 1990 Clean Air Act, the acceptable cancer risk used by the USEPA to make regulatory decisions regarding the need for further air pollution reductions from sources or to identify significant concerns from ambient monitoring data is 100-in-a-million (1×10^{-4}). The acceptable cancer risk used by NYSDEC's Division of Air Resources to make regulatory permitting decisions about the need to consider further air pollution controls for sources ranges from 1-in-a-million to 10-in-a-million (1×10^{-5}). This is more conservative than USEPA's acceptable level of concern. The selection of an acceptable level of concern is a risk management decision.[29]

[29] The interpretation of the sample results involves evaluating potential risk from the measured air concentrations. This process is called risk assessment – developing estimates of potential health effects associated with the exposure of individuals or populations to the measured air concentrations. Risk Management is a distinctly different process

These guideline values are not bright lines between air concentrations that cause health effects and those that do not. They are values that are used by NYSDEC to assess the acceptability of proposed new air pollution sources during the permitting process, and are also used to evaluate the results of ambient air monitoring studies that measure the impacts of numerous sources of air pollution in an area. The purpose of the guideline is to help guide decisions about reducing community exposure to air pollution. More information about controlling air pollution sources and the derivation of AGCs from cancer and non-cancer endpoints can be found in *Controlling Sources of Toxic Air Contaminants,* Appendix A.

NYSDEC's Air Toxics Monitoring Network

NYSDEC has operated an air toxics monitoring network across the State since 1990. The purpose of the ambient air toxics monitoring network is to support NYSDEC's efforts to reduce human exposure and health risks from toxic air contaminants, commonly referred to as air toxics. NYSDEC established the network to support four major objectives:

- Establish trends and evaluate the effectiveness of air toxics emissions reduction strategies.
- Characterize ambient concentrations (and deposition) in local areas. Air toxics often originate from local sources and can concentrate in relatively small geographical areas, producing the greatest risks to human health.
- Provide data to support, evaluate, and improve air quality models. Air quality models are used to develop emission control strategies, perform exposure assessments, and assess program effectiveness.
- Provide data to support scientific studies to better understand the relationship between ambient air toxics concentrations, human exposure, and health effects from these exposures.

NYSDEC's air toxics monitoring network is designed to measure an average exposure over the course of a year. Samples are collected over a 24 hour period, on a one-in-six day schedule. In 2013, the network consisted of 11 monitors for toxic air contaminants located in urban, industrial, residential and rural areas of the State. In this screening assessment, NYSDEC compared year 2013 air toxics monitoring data to the screening sample results to provide a perspective on monitored concentrations obtained in these various locations in comparison to the 1 hour results obtained in the Albany South End community.

It is generally known that areas with higher population densities have more sources of air toxics such as cars, trucks, gas stations and dry cleaners. NYSDEC has grouped the monitors by land-use classification

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from risk assessment. Risk managers use the results of the risk assessment to make further decisions such as the need for more sampling, facility inspections or emission reduction strategies.

into urban, suburban and rural locations. Additionally, monitors sited to capture releases from specific sources have been grouped together.

NYSDEC's Community Air Screen Program (CAS)

Through funding provided by the USEPA, NYSDEC implemented a community-based screening program (CAS) for toxic air contaminants. The goal of the NYSDEC's CAS program was to conduct air quality screening at the community-level with the help of local community groups and interested citizens. NYSDEC provided the sampling equipment, trained participants on how to use the equipment and worked with the community to determine the best location and time period for air sampling. Air samples were analyzed by NYSDEC's laboratory for a suite of VOCs determined by USEPA's TO-15 method.

The objectives of CAS program were to understand community concerns arising from air toxics on a localized level and to work with the community to address problems. NYSDEC selected participants through an application process and sampling began in 2012 and continued into the spring of 2014. The program utilized sampling equipment that collected air over a short period of time, 1 hour. The goal of this type of sampling was to provide a quick understanding of the types of air toxics found in the community using USEPA-approved air sampling equipment and analysis method. Participants targeted sample collections during periods of concern such as visible emissions or noticeable odors. Sampling during these specific times, may reflect periods of potentially higher air toxic concentrations. If the screening detected air toxics at levels of concern, additional air screening and follow-up activities were conducted. One benefit of the screening approach is that it allows for a rapid assessment of many communities Statewide.

Since the samples were collected over a short period of time and there were a limited number of samples, the information obtained could not be used for enforcement or compliance purposes. Additionally, the results from the program could not be used to provide a complete understanding of risk attributable to air toxics in the community. The results were used as a screening tool. If the results showed levels of concern, then additional, longer-term sampling was conducted.

Results

Air Samples Collected by NYSDEC Staff and Community

Volatile Organic Compounds

All results for the five NYSDEC and six community volunteer air sampling events are shown in Appendix G, Tables 1-7 along with comparisons to NYSDEC's air concentration values. As shown, the results for all samples collected by NYSDEC and the community are well below the short-term air concentration values. The measured results for the air toxics from this short-term assessment would not be considered a potential health threat or an immediate public health concern.

All 43 air contaminants analyzed were detected in one or more samples. Only 17 air contaminants[30] were detected in all samples. Appendix H lists all toxic air contaminants evaluated in this screening assessment with information on uses and possible industries or other sources that release these air contaminants.

The results for VOCs typically associated with crude oil[31] can be found in Table 3. The results are compared to NYSDEC's short-term health-based air concentration values. As shown, the concentrations for these toxic air contaminants are well below the short-term air concentration values. The measured results for these air toxics from this short-term assessment would not be considered an immediate public health concern.

Table 3 also shows that many of the results for these samples are below the long-term health-based air concentration values. The long-term health-based air concentration values for carcinogens are set at a level that corresponds to an individual being exposed for a lifetime and having the concentration add an additional cancer risk[32] of a 1-in-a-million. The measured benzene concentrations are in the range of 1-in-a-million to 5-in-a-million cancer risk. The acceptable cancer risk used by NYSDEC's Division of Air Resources to make regulatory permitting decisions about the need to consider further air pollution controls for sources ranges from 1-in-a-million to 10-in-a-million (1×10^{-5}) and the estimated risk for benzene from this screening assessment is in that range. Additionally, the measured benzene concentrations the Albany South End screening are well below USEPA's acceptable level of concern at 100-in-a-million cancer risk.

NYSDEC compared the results to 1 hour samples collected in NYSDEC's CAS program[33], monitoring results from NYSDEC's Air Toxics Network and the USEPA neighborhood sample.[34] As illustrated in Figure 5 the benzene concentrations from both samplers, the community volunteer and NYSDEC staff are similar with little variability in the measured results between the 11 sampling events. The Albany South End results also are comparable to screening sample measurements in NYSDEC's CAS program (see Appendix I for all comparisons) and fall within the range of urban, suburban and rural measurements in NYSDEC's Air Toxics Network (see Appendix J for all comparisons).

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[30] The 17 air contaminants are 1,2,4-trimethylbenzene, 1,2-dichloroethane, benzene, bromoethane, carbon tetrachloride, chloroethane, chloroform, chloromethane, dichlorodifluoromethane, dichloromethane, dichlorotetrafluoroethane, ethylbenzene, *m,p*-xylene, *o*-xylene, toluene, trichlorofluoromethane and trichlorotrifluoroethane.

[31] NYSDEC's factsheet *DEC Responses to Community Questions & Requests Regarding Global Companies Plan to Heat Crude Oil at the Port of Albany*, March 6, 2014 provides a link to a table of chemical constituents commonly found in crude oil, developed by the Centers for Disease Control and Prevention (CDC). NYSDEC's factsheet is available online at: http://www.dec.ny.gov/permits/95623.html. CDC's table can be found online at: http://www.bt.cdc.gov/gulfoilspill2010/pdf/chemical_constituents_table.pdf

[32] This risk would be an excess cancer risk that is in addition to any cancer risk borne by a person not exposed to these air toxics.

[33] Twenty-three community groups participated in the CAS program. Over the course of the program, approximately 70 samples were collected in urban, suburban and rural areas of the State.

[34] Further discussion of USEPA samples can be found in the section *Air Samples Collected by USEPA.*

The State average concentration for benzene from the 2013 monitoring result[35] is included in Figure 5 and most of the results from the Albany South End screening are below the State average. Overall the range of benzene concentrations in Figure 5 is narrow, suggesting mobile sources (cars, buses, trucks, trains) as the primary contributor across the State. Comparisons with other NYSDEC results confirms the ubiquitous nature of benzene in urban, suburban and rural locations.

Appendix G, Tables 1-7 also shows that many of the results for these samples are below the long-term health-based air concentration values. The long-term concentration values for carcinogens are set at a 1-in-a-million cancer risk. The results from the community sampling for 1,2-dibromoethane, 1,2-dichloroethane, 1,3-butadiene, benzene, carbon tetrachloride and hexachloro-1,3-butadiene, are in NYSDEC's risk management range of 1-in-a-million to 10-in-a-million cancer risk and well below USEPA's acceptable level of concern at 100-in-a-million cancer risk. As illustrated by the graphs in Appendix I, the concentrations of these six air toxics are similar to the 1-hour sampling concentrations in the CAS program and similar to the monitoring concentrations found at urban and suburban locations in NYSDEC's toxics network, see Appendix J.

[35] The results from the two monitors cited to capture source information have been removed from the State average calculation.

Table 3. Results for VOCs Typically Associated with Crude Oil

Location	Date	Benzene[a] (ppb)	Ethyl-benzene (ppb)	*m,p*-Xylene (ppb)	*o*-Xylene (ppb)	Toluene (ppb)
Community Samples						
Mt. Hope St. near South Pearl St.	4/28/2014	0.065	0.0080	0.020	0.0090	0.063
Green St. next to Interstate-787 south bound access road	5/10/2014	0.17	0.049	0.16	0.060	0.37
Ezra Prentice Building 637	5/20/2014	0.061	0.011	0.030	0.014	0.096
Church St. and Broadway	5/29/2014	0.19	0.086	0.26	0.096	0.85
North end of Ezra Prentice Playground	6/17/2014	0.081	0.024	0.063	0.027	0.22
Gansevoort & Franklin Streets	7/6/2014	0.12	0.039	0.13	0.050	0.30
NYSDEC Samples						
Ezra Prentice Playground	5/8/2014	0.064	0.0090	0.019	0.011	0.057
Krank Park - Cherry Hill	5/8/2014	0.063	0.0080	0.015	0.0080	0.052
Gansevoort & Franklin Streets	5/8/2014	0.087	0.014	0.035	0.016	0.10
Ezra Prentice Playground	5/12/2014	0.11	0.031	0.11	0.039	0.28
Krank Park - Cherry Hill	5/12/2014	0.086	0.018	0.046	0.019	0.16
Gansevoort & Franklin Streets	5/12/2014	0.20	0.055	0.18	0.066	0.44
Ezra Prentice Playground)	5/21/2014	0.17	0.046	0.13	0.052	0.45
Krank Park - Cherry Hill	5/21/2014	0.12	0.030	0.078	0.033	0.31
Gansevoort & Franklin Streets	5/21/2014	0.21	0.051	0.14	0.059	0.46
Ezra Prentice Playground	5/29/2014	0.070	0.029	0.068	0.027	0.16
Krank Park - Cherry Hill	5/29/2014	0.037	0.012	0.021	0.011	0.057
Gansevoort & Franklin Streets	5/29/2014	0.047	0.013	0.024	0.012	0.067
Ezra Prentice Playground	6/2/2014	0.13	0.029	0.079	0.029	0.24
Krank Park - Cherry Hill	6/2/2014	0.11	0.029	0.073	0.027	0.23
Gansevoort & Franklin Streets	6/2/2014	0.14	0.053	0.15	0.049	0.37
Short-Term (1 hour) Health-Based Air Concentration Values		400	12,000	5,100	5,100	9,800
Long-Term Health-Based Air Concentration Values[b]		0.040	230	23	23	1,300

[a] Benzene is classified as a carcinogen.

[b] 1 hour samples are not representative of annual lifetime exposures. Comparisons to the long-term values have been done to determine whether follow-up sampling and/or enhanced facility inspections should be conducted.

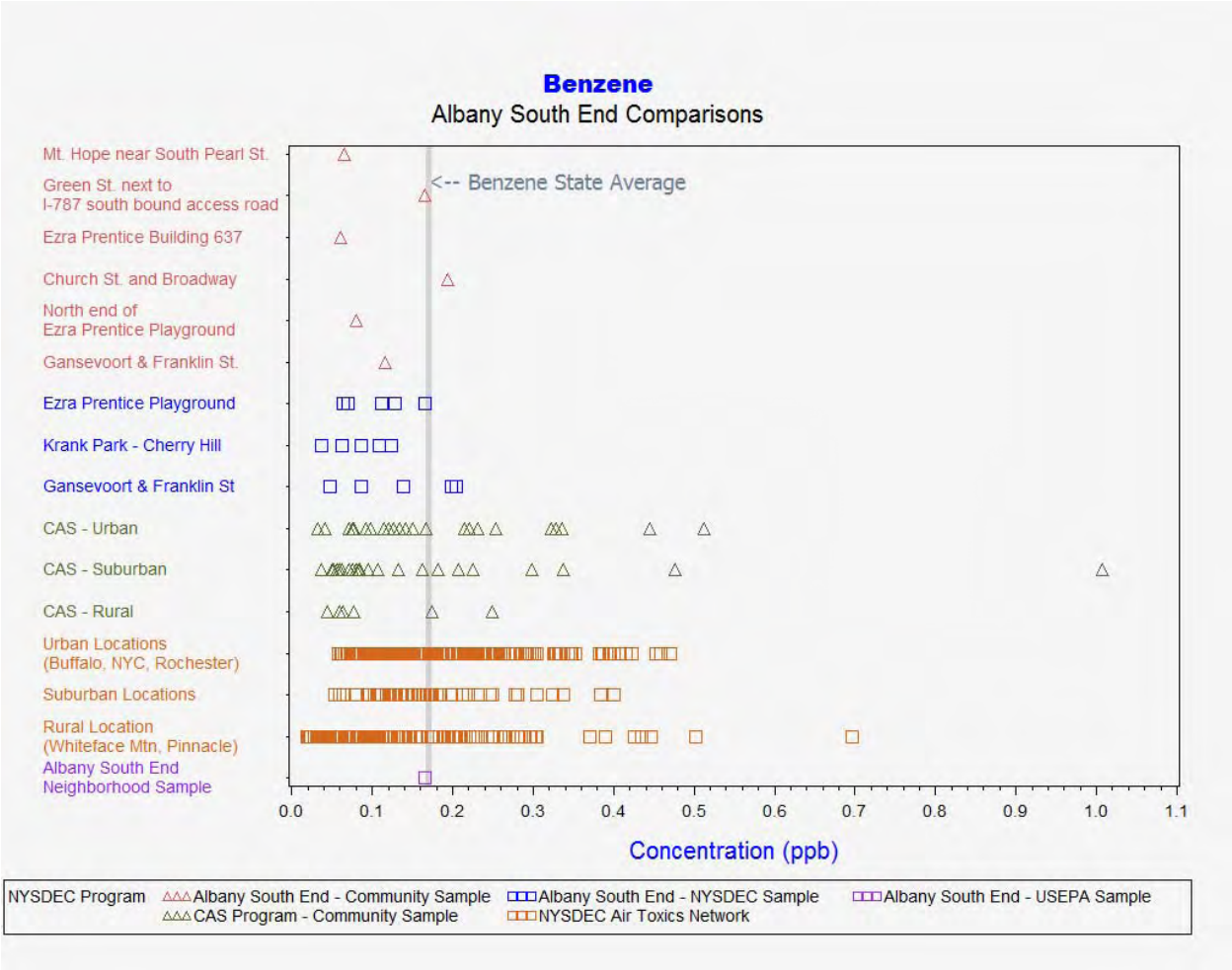

Figure 5. Comparison Albany South End Benzene Results with Community Air Screen, NYSDEC Air Toxics Monitoring and USEPA sample Results

Light-weight Alkanes

NYSDEC included light-weight alkanes in the analysis of the samples collected by staff and the community. The results are displayed in Table 4. The measured concentrations for all alkanes are well below the short-term and long-term health-based air concentration values and would not be considered a public health concern. Although NYSDEC monitors for alkanes in the Photochemical Assessment Network, comparisons to alkane measured values elsewhere were not performed because the screening results in Albany South End were appreciably lower than the health-based concentration values.

Table 4. Results for Light-weight Alkanes

Location	Date	Butane (ppb)	Hexane (ppb)	Isobutane (ppb)	Isopentane (ppb)	Pentane (ppb)	Propane (ppb)
Community Sample							
Mt. Hope near South Pearl St	4/28/2014	0.49	0.038	0.17	0.31	0.16	1.1
Green St. next to I-787 south bound access road	5/10/2014	8.3	0.57	2.6	2.9	2.5	18
Ezra Prentice Building 637	5/20/2014	1.9	0.11	0.74	0.80	0.56	4.0
Church St. and Broadway	5/29/2014	3.3	0.41	0.76	4.9	1.9	1.7
North end of Ezra Prentice Playground	6/17/2014	1.3	0.14	0.37	1.4	0.78	1.9
Gansevoort & Franklin St	7/6/2014	2.7	0.47	0.59	3.2	1.8	2.5
NYSDEC Sample							
Ezra Prentice Playground	5/8/2014	1.6	0.17	0.45	1.1	0.70	2.8
Krank Park - Cherry Hill	5/8/2014	1.4	0.077	0.39	0.8	0.50	2.5
Gansevoort & Franklin St	5/8/2014	3.2	0.22	0.90	1.4	1.1	6.1
Ezra Prentice Playground	5/12/2014	2.8	0.35	0.77	2.8	1.5	3.8
Krank Park - Cherry Hill	5/12/2014	2.1	0.23	0.59	2.3	1.2	3.0
Gansevoort & Franklin St	5/12/2014	11	1.0	3.1	5.5	3.9	20
Ezra Prentice Playground	5/21/2014	6.8	0.57	1.9	3.9	2.5	11
Krank Park - Cherry Hill	5/21/2014	5.0	0.36	1.4	3.0	1.8	7.9
Gansevoort & Franklin St	5/21/2014	14	1.0	4.1	5.6	4.3	27
Ezra Prentice Playground	5/29/2014	1.2	0.16	0.33	1.0	0.59	1.4
Krank Park - Cherry Hill	5/29/2014	1.1	0.08	0.32	0.6	0.4	1.9
Gansevoort & Franklin St	5/29/2014	2.6	0.15	0.76	1.0	0.8	4.8
Ezra Prentice Playground	6/2/2014	7.8	0.80	2.6	3.3	2.8	17
Krank Park - Cherry Hill	6/2/2014	4.5	0.48	1.4	2.5	1.7	8.8
Gansevoort & Franklin St	6/2/2014	4.7	0.47	1.4	4.2	2.0	7.0
Short-Term (1 hour) Health-Based Concentration Values		100,000	--[b]	100,000	--	--	--
Long-Term Health-Based Concentration Values[a]		--	200	--	1,400	1,400	24,000

[a] 1 hour samples are not representative of annual lifetime exposures. Comparisons to the long-term values have been done to determine whether follow-up sampling and/or enhanced facility inspections should be conducted.

"--" indicates no health-based air concentration value has been developed for that exposure period.

[b] An interim short-term health-based air concentration value of 12,200 ppb was developed for the Revised Draft Supplemental Generic Environmental Impact Statement on the Oil, Gas and Solution Mining Regulatory Program (September 2011).

Air Samples Collected by USEPA

The USEPA collected samples of 20-second duration. These samples were not compared to the short-term (1 hour) and long-term (annual) health-based air concentration values because it is not a valid practice for such short sample times. The short-term health-based air comparison value assumes an hour exposure to a consistent concentration. The long-term health-based air comparison values assume continuous exposure for a life-time (70 years). Short collection samples are not representative of an hour or annual lifetime exposures.

The results from USEPA sample collected in the residential neighborhood were graphically compared with the results obtained by the samples collected by NYSDEC and the community volunteer. This comparison is presented in the graphs in Appendix K. Also included in the graphs are the results from the 1 hour sampling in NYSDEC's CAS Program[36] and the method detection limits. The graphs show that the results for the USEPA neighborhood sample are consistent with the results obtained in the CAS program and results from the Albany South End screening assessment.

The method detection limits (MDL) are also displayed in the graphs. The MDL is the minimum concentration that can be measured and reported with 99 percent confidence that the concentration is greater than zero.[37] As illustrated the MDLs for the samples analyzed by NYSDEC's laboratory are consistently lower than the MDLs for the contract laboratory used by USEPA. For many of the contaminants, the ambient levels are higher than detection limits. But others, such as 1,3-butadiene, although present in the air, were not detected in the USEPA samples. Reviewers should consider the different detection limits when comparing the number of contaminants detected by the two laboratories.

The comparisons between the light-weight alkanes from USEPA and NYSDEC's samples also are illustrated in Appendix K. Light-weight alkanes were not evaluated in the CAS program. The graphs show that the results for the light-weight alkanes measured by USEPA in the neighborhood are consistent with the results obtained from the Albany South End screening assessment.

Spatial Data Analysis

The design of the study included simultaneous collection of 1 hour samples at three locations in the Albany South End neighborhood on five sample days. The three sampling locations are within the community and are less than 1,000 meters from each other. The samples were collected simultaneously so that the data from the three locations could be directly compared to one another. The concentrations of air contaminants at these three sampling locations would normally be very similar unless there is a nearby source impacting one of the sampling locations to a higher degree than the other two locations. The concentrations of air toxics as represented by benzene were then compared to determine if there was a nearby source. For the purpose of this screening assessment, the less

[36] Twenty-three community groups participated in the CAS program. Over the course of the program, approximately 70 samples were collected near sources and in urban, suburban and rural areas of the State.

[37] *Code of Federal Regulations* (Title 40, Part 136, Appendix B, Revision 1.11)

impacted site will be referred to as the "background" site indicating that it is the NYSDEC sampling location with the lowest concentration of an air contaminant. Although nearby sources can impact all three locations, the difference between the concentration of an air contaminant at the locally impacted site and the background site can be attributed to nearby sources in the upwind direction. The magnitude of the differences (gradients) indicate the strength and the proximity of the local source. It is assumed that emission sources that are further upwind even if they are of a similar type or are much larger than nearby sources will more evenly impact all three sampling locations and the resulting gradient between the sites will be lower. The wind direction data collected at the Albany Waste Water Treatment Plant on Church Street were used to determine the wind direction for the 1 hour sampling period on each of the five sample days.

The results from three of the five sampling events (May 8, 12, 21) indicate a clearly defined concentration gradient for benzene and the alkanes that is consistent with the local wind direction. Samples only were collected on days when the wind was coming from the south or south-east so for the 1 hour collection periods on May 8, 12 and 21, Gansevoort and Franklin was the locally impacted site, Krank Park was the sampling location with the lowest impact from a source in the upwind direction (background site) and the Ezra Prentice site was either similar to the background site or was partially impacted by a local upwind source. In order to simplify the analysis and presentation of the data, benzene is used to represent the concentration of air toxics in each sample. The concentrations of the other air toxic compounds found in each sample are available in Appendix G. Table 5 shows the concentrations of benzene and the differences between the downwind and background site for the 1 hour sample periods on May 8, 12 and 21.

Table 5. Benzene Concentrations from the NYSDEC 1 hour Sample events (ppb)

Sample Date	Locally Impacted Site: Gansevoort & Franklin	"Background" Site: Krank Park	Locally Impacted Site minus "Background"
May 8	0.087	0.063	0.024
May 12	0.20	0.086	0.112
May 21	0.21	0.12	0.082

The results from May 29 and June 2 did not clearly indicate a locally impacted and a "background" site for the 1 hour sample collection periods. On these days, the benzene and alkane gradients did not match each other indicating the presence of sources other than those originating from fuel handling operations. The benzene concentration data from May 29 were low for all three of the sites though Gansevoort and Franklin is the highest of the three. The last sample collection day (June 2) indicates a regional pattern and again, Gansevoort and Franklin has slightly higher benzene levels. Air toxics concentrations were very similar at all three sites on June 2 which was also the only sample day when emissions from morning rush hour were targeted. Table 6 shows the concentrations of benzene for the 1 hour sample collection periods at all three sites on May 29 and June 2.

Table 6. Benzene Concentrations from the 1 hour NYSDEC Sample events (ppb)

Sample Date	Gansevoort & Franklin	Krank Park	Ezra Prentice
May 29	0.047	0.037	0.070
June 2	0.14	0.11	0.13

NYSDEC included the analysis of alkanes in this study because these compounds have been identified as components of crude oil including Bakken crude oil.[38] The sums of the concentrations of four alkanes (butane, hexane, pentane and propane) are used to help identify the origin of the air toxics impacting the downwind sampling location. The four alkanes selected for this study are also associated with other fuel handling, natural gas and propane distribution. NYSDEC monitors the concentrations of alkanes in New York City as part of the USEPA Photochemical Assessment Monitoring program.[39] Table 7 shows the sum of the concentrations of the four light alkanes selected for this analysis. Figures 6 through 10 show the sum of alkanes and the concentration of benzene for each of the NYSDEC sample days.

Table 7. Sums of Selected Alkanes (Butane, Hexane. Pentane and Propane) from the NYSDEC Sample events (ppb)

Sample Date	Gansevoort & Franklin (ppb)	Ezra Prentice (ppb)	Krank Park (ppb)
May 8	10.55	5.27	4.52
May 12	36.00	8.45	6.57
May 21	46.38	20.51	14.96
May 29	8.27	3.32	3.43
June 2	14.14	28.32	15.54

[38] A Survey of Bakken Crude Oil Characteristics Assembled for the U.S. Department of Transportation: (Propane 0.80%, Butane 2.36%, Pentane 2.36%, Hexanes 4.10%), 2014

[39] The NYSDEC measures the concentrations of alkanes in the summer, hourly at one location in New York City for the Photochemical Assessment Monitoring Stations (PAMs) program. The maximum 1 hour concentrations from 2013 were: Propane 11.43 ppb, Butane 2.70 ppb, Pentane 5.12 ppb and Hexane 0.46 ppb. These values can be compared to study results in Table 4.

The data from the May 8 (1 hour) Sample (Figure 6) event shows that the downwind site at Gansevoort and Franklin Street is impacted by sources to the south. It is apparent that the alkanes have a larger difference between the downwind and the background site. The temperature averaged 69^0 F. during the sampling period.

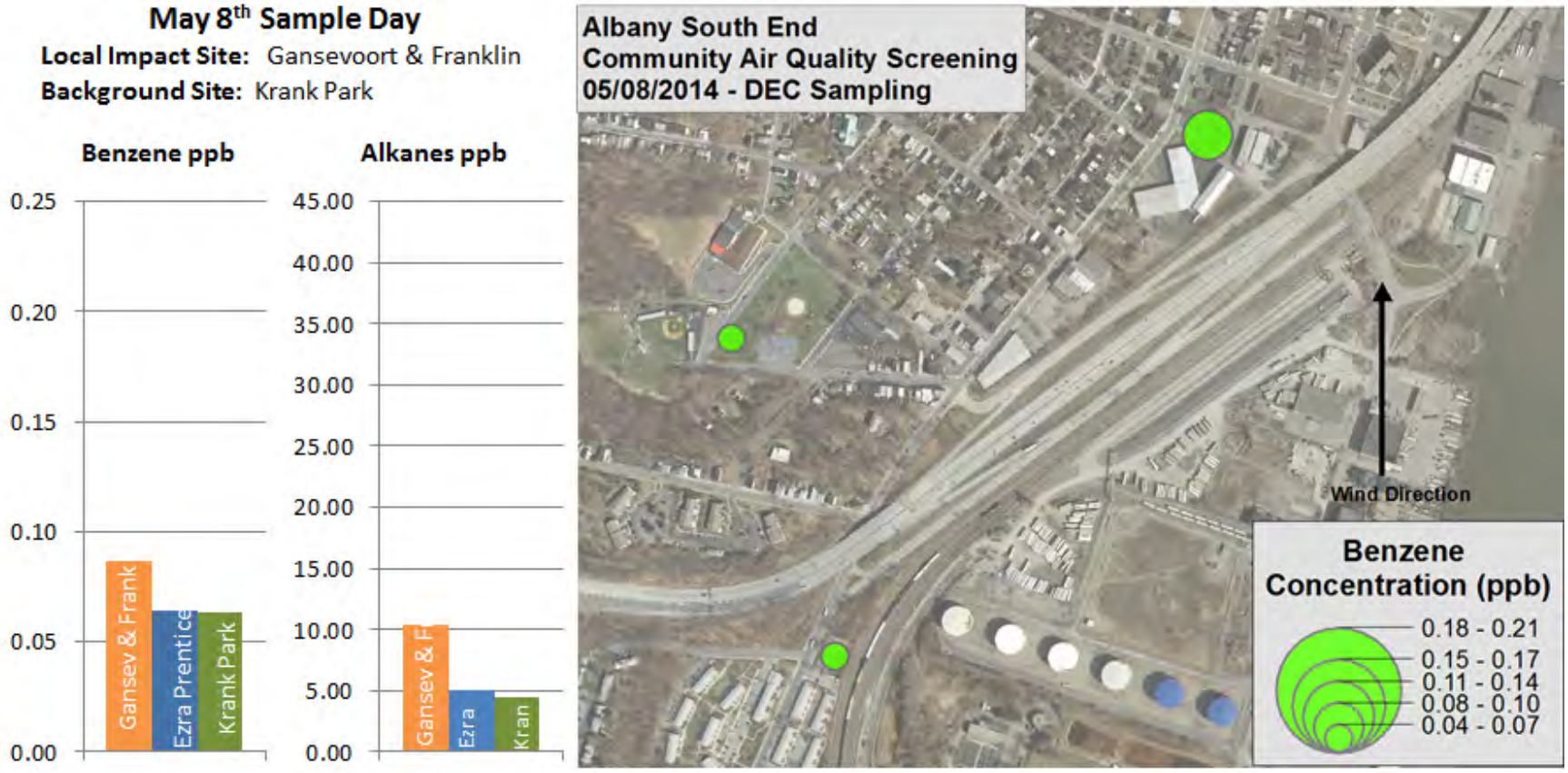

Figure 6. May 8 NYSDEC Sampling Event

The 1 hour concentrations of air toxics are higher on May 12 (Figure 7). The data shows that the downwind site at Gansevoort and Franklin Street is impacted by sources to the south though the site at Ezra Prentice is also impacted. It is also apparent that the alkanes have a larger difference between the downwind and the background site than the data indicated on May 8. The temperature was warmer (77^0 F) on May 12.

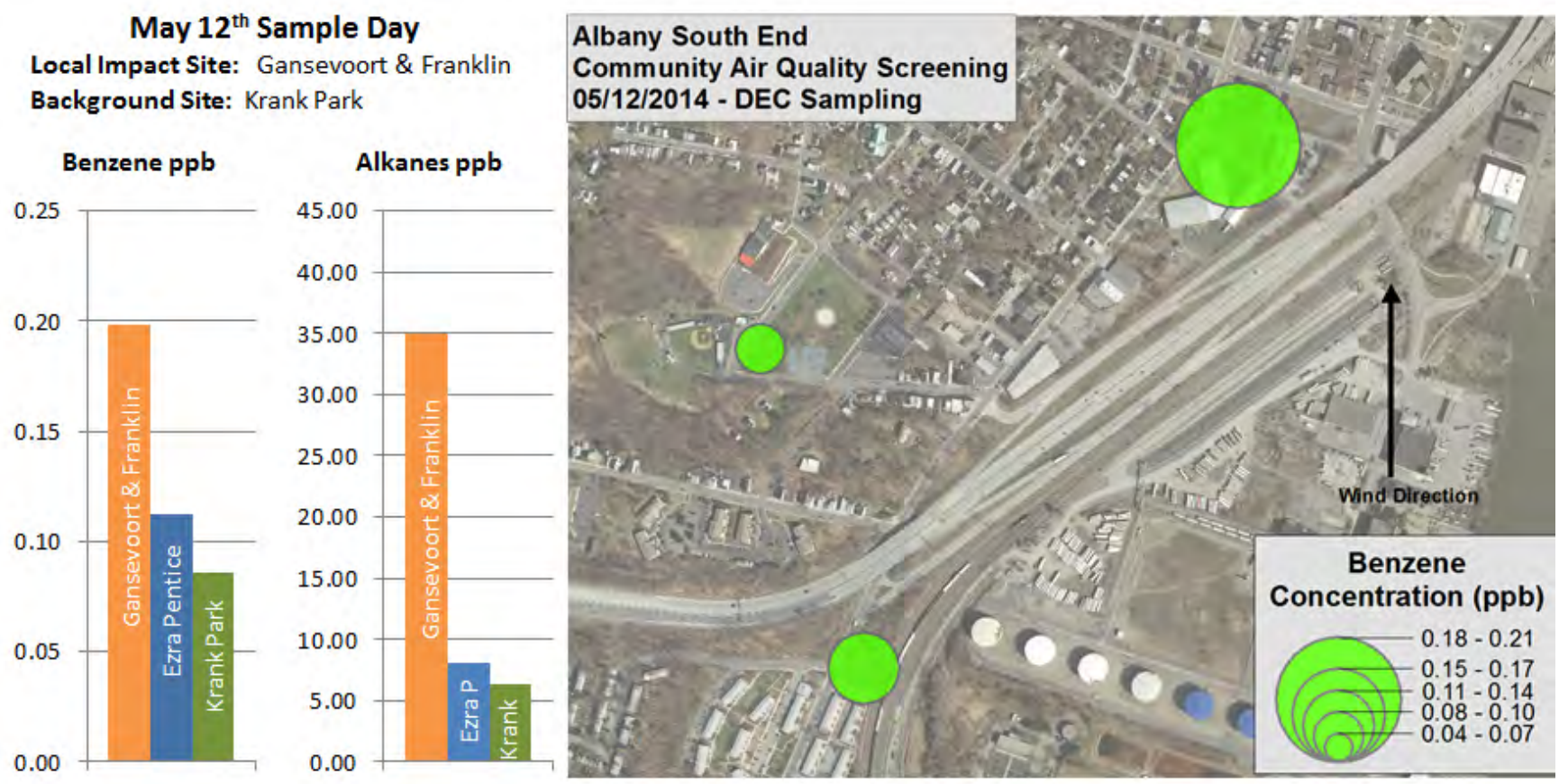

Figure 7. May 12 NYSDEC Sampling Event

The concentrations of air toxics as represented by benzene are relatively high during the 1 hour sampling event on May 21 (Figure 8Figure 8) and are similar at Gansevoort and Franklin Street and at Ezra Prentice. The wind direction indicates that the significant sources are from the south and east. The temperature averaged 74^0 F. during the sampling period.

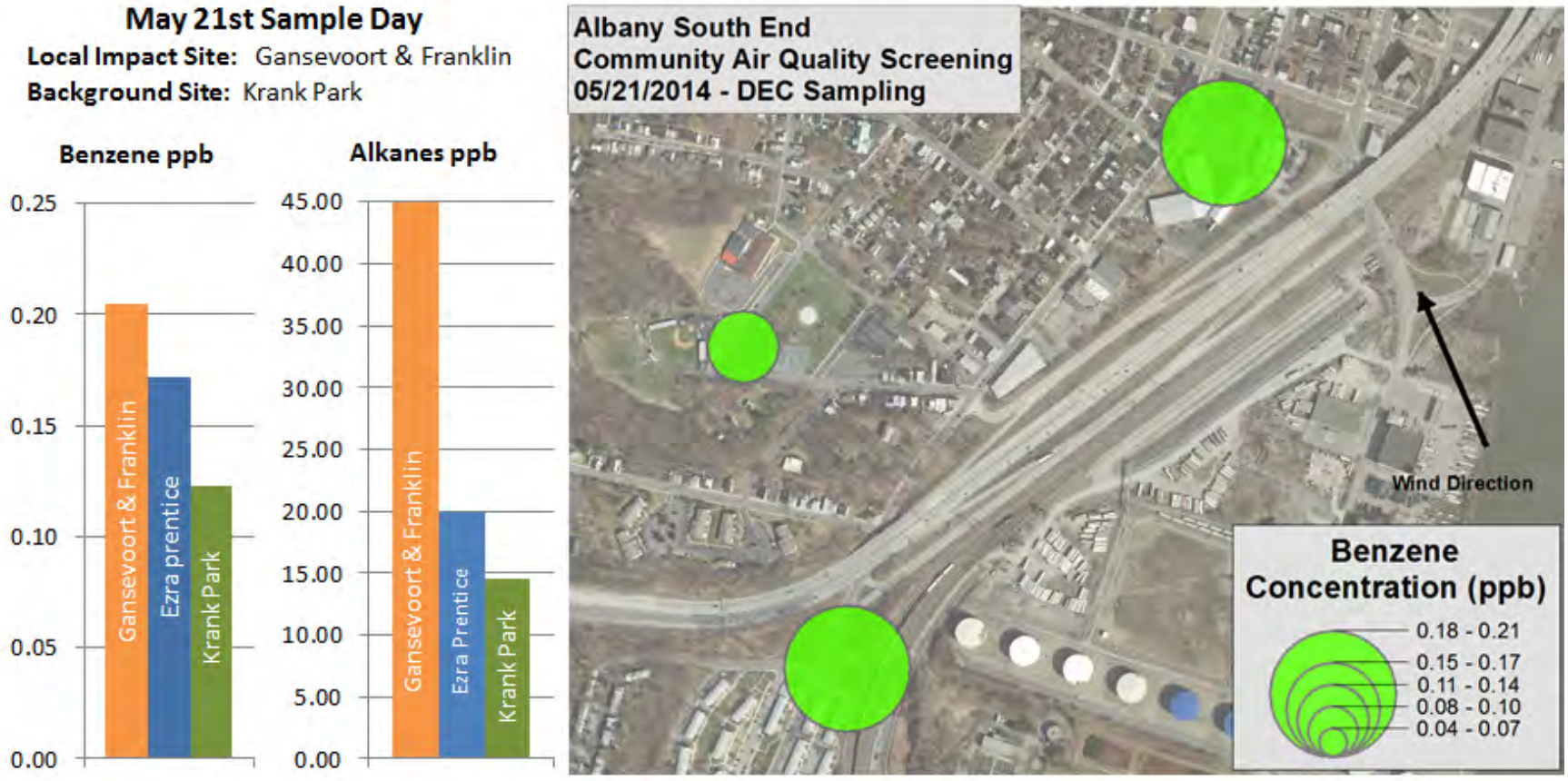

Figure 8. May 21 NYSDEC Sampling Event

The concentrations of air toxics are lower for the 1 hour sampling period on May 29 (Figure 9) and the concentrations of alkanes are lower at Ezra Prentice than at Krank Park. The concentration of benzene was lower at Krank Park which makes it difficult to determine a "background" site for this sampling event. The wind direction indicates that the significant sources are from the south and east. The temperature averaged 70^0 F. during the sampling period.

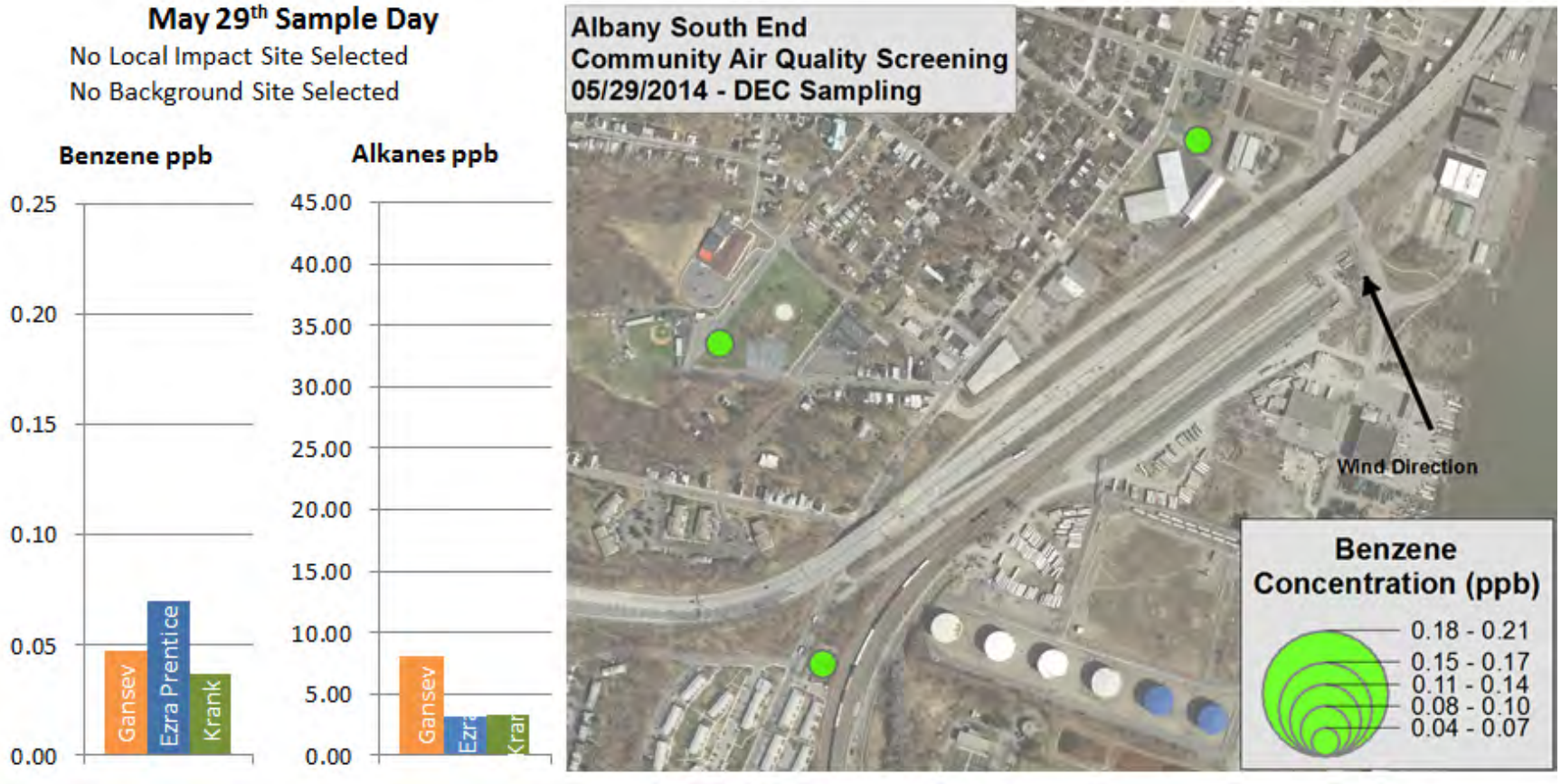

Figure 9. May 29 NYSDEC Sampling Event

The June 2 (1 hour) (Figure 10) sampling event occurred at 8:10 am and was designed to capture the emissions from morning rush hour on I-787 and local roadways. Concentrations of air toxics were similar at the three sites and slightly elevated and the concentrations of alkanes were higher at Ezra Prentice than the other two sites. The temperature averaged 68^0 F. during the sampling period.

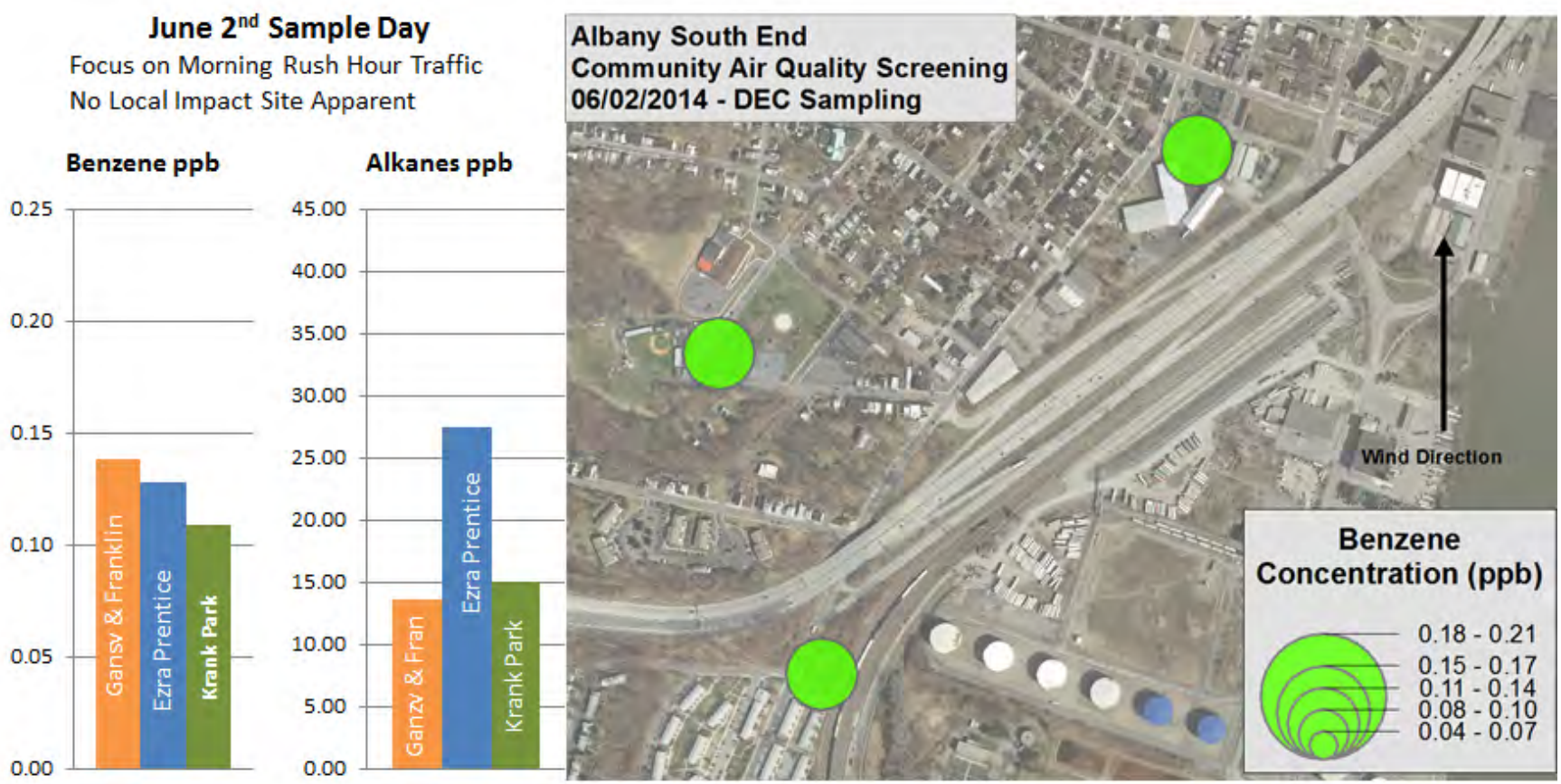

Figure 10. June 2 NYSDEC Sampling Event

The alkanes were added to the study because these compounds as well as others including benzene are found in crude oil and the concentrations of alkanes can help identify source categories of air toxics. In this analysis, the alkane concentration gradients when matched with benzene provide an indication of the impact of evaporative emissions from crude oil on air toxics in the community. The alkane results for the sampling periods with an identified local impact site and background site (May 8, 12, 21) exhibit a larger concentration gradient than benzene. Because benzene is attributed to additional source categories, both evaporative from crude and other fuels and combustion-related, it is not surprising that the benzene concentrations show less of a gradient than the alkanes and don't match at all on some days. The higher gradient of the alkanes establish that not all the benzene is attributable to evaporative emissions from local fuel handling sources. The magnitude of the concentration gradients for benzene from May 8, 12 and 21 between the locally impacted site and the background site can be calculated. The calculation (locally impacted concentration minus background concentration) provides an indication of the strength of the local source for the sampling period. The values are 0.024, 0.112 and 0.082 ppb for the three sampling periods. Two out of three of these values are less than the regional background benzene concentration for the same sampling periods. This also indicates that for these sampling periods, the contribution of benzene from local sources is similar to or less than the contributions from sources further upwind.

Conclusions

NYSDEC's Division of Air Resources works to minimize the amount of toxic air contaminants that is released to the atmosphere.[40] Across the State, thousands of tons of toxic air contaminants are released from manmade sources such as cars, trucks, power plants, manufacturing factories and smaller sources such as dry cleaners and gasoline stations. In and near this community, the sources of toxic air contaminants include emissions from cars, trucks, trains, petroleum storage and transfer, electric generation units, waste water treatment, manufacturing, solid waste management, recycling operations, dry cleaners, residential space heating, gasoline stations, auto repair and auto refinishing shops.

In this community air quality screening, air samples were collected for 1 hour by NYSDEC staff on five dates at three fixed locations and by a community volunteer on six dates at various locations from April 28 to July 6, 2014. The samples were analyzed for the presence of 43 toxic air contaminants and six light-weight alkanes. All 43 toxic air contaminants were detected in one or more samples. The alkanes were detected in all samples analyzed. All contaminants evaluated were below NYSDEC's short-term health-based air concentration values. Therefore, the results would not be considered an immediate public health concern. It is difficult to draw definitive conclusions about the long-term risk from this short-term air sampling. The results are within the acceptable target risk level (1-in-a-million to 10-in-a-million) used by NYSDEC to make decisions about the need to consider further air pollution controls for sources and well below USEPA's acceptable level of concern at 100-in-a-million cancer risk.

NYSDEC compared the results to measured concentrations from samples collected in NYSDEC's Community Air Screen program and NYSDEC's Air Toxics Monitoring Network. The comparisons suggest that the level of contaminants screened in Albany South End community are similar to levels found in suburban and other urban locations of the State.

USEPA conducted sampling at one community location during NYSDEC's screening assessment. The sample was collected for a 20-second period and analyzed for a suite of air toxics that included some of the air toxics and alkanes evaluated by NYSDEC. For the contaminants commonly found in crude oil, the results are similar to concentrations found in the samples collected in the community by NYSDEC staff and the community volunteer.

In conclusion, this limited short-term screening assessment did not identify concentrations of toxic air contaminants that would be considered an immediate public health concern which was the focus of this screening assessment.

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[40] To learn more about State and federal programs to protect the public from adverse effects of toxic air contaminants from both stationary (large industrial facilities and some specific small sources) and mobile sources (such as cars, trucks, airplanes and trains and lawn, farming and construction equipment), read Appendix A.

Limitations/Uncertainties

The assessment is limited to contaminants evaluated by USEPA's TO-15 method. The activities related to crude oil movement in the Port of Albany may release contaminants not captured by the sampling and analysis methods, such as particulate matter and oxides of nitrogen, but these pollutants are regulated by the Clean Air Act and must meet specific limitations to minimize their release.

This screening assessment is a snap-shot in time and the conclusions drawn may not be representative of conditions in this area in the future. The results from this air quality screening cannot be compared with confidence to long-term health risks from exposure because of the different averaging period. The 1 hour sample represents a snap-shot of information and cannot be definitely representative of the entire year. The sampling method is a short-term assessment and many factors affect concentrations of contaminants in a neighborhood. Factors include, but are not limited to, time of day, wind speed and direction, and activities going on in the area. For example, facility and operation releases may be cyclical depending on production schedules. Meteorological conditions also greatly influence local pollutant concentration. Because of the limits of a 1 hour sampling interval, a 1 hour sample at another time could be lower or higher in comparison to the results from this screening assessment. Some of the samples collected by the community volunteer were done during odor episodes and during presence of railcars at the Port which suggests that the results evaluated in this screening assessment may include results that reflect single periods of potentially higher concentrations.

Finally, it should not be assumed that the results from this screening assessment represent an individual's exposure. Results from any single location, whether from short-term or long-term sampling, do not account for the fact that people spend time in many locations during the day as well as spend time indoors and outdoors. Other factors (such as smoking, pumping gasoline, hobbies and occupations using solvents) can lead to increases in an individual's toxic air contaminant exposures and contribute to the overall uncertainty in characterizing risk from the short-term sampling obtained in this screening assessment.

Next Steps

One of the topics discussed during the public meetings held in the Albany South End community was whether the NYSDEC had sufficient baseline data for contaminants such as formaldehyde and hydrogen sulfide. These contaminants have been associated with the extraction of crude oil originating from the oil sands reserves in Canada. The concerns expressed by the public were due to the potential shipment of heavier oil sands crude oil through Albany's Kenwood rail yard.

Formaldehyde is a contaminant that can be emitted from a source or formed through photochemical reactions in the atmosphere. The concern for formaldehyde concentrations associated with oil sands development is primarily due to the formation of formaldehyde in areas where the extraction of oil sands crude releases chemicals such as methane and ethane that contribute to the formation of formaldehyde in the presence of sunlight.

NYSDEC does not have existing data for formaldehyde in the Albany South End community. In response to the community's request, NYSDEC added a formaldehyde monitor to NYSDEC's monitoring site at the Albany County Health Department (175 Green Street) in May and 24 hour samples will be collected on a one day in six schedule through August. This collection period will capture the summer months when the concentrations of compounds formed through photochemical reactions are highest. A data report will be posted on NYSDEC's website and shared with the Albany South End community once the data collected through August are available.

Hydrogen sulfide is a compound that is often released into the atmosphere when oil sands crude is extracted. This compound is also routinely found in crude oil and its concentration varies due to the origin of the crude oil and the extent to which the crude oil has been processed. No concern has been expressed that the current oil handling operations in the Albany South End community were impacting area hydrogen sulfide concentrations.

NYSDEC does not have existing data for hydrogen sulfide in the Albany South End Community. In response to the community's concerns, NYSDEC plans to collect background hydrogen sulfide data in the community. NYSDEC expects to find hydrogen sulfide in the community from the activities at the wastewater treatment plant, south of the Kenwood rail yard and the open grates of the sewer system in the city. NYSDEC recently procured a portable hydrogen sulfide instrument and will develop the necessary protocols to commence a neighborhood survey of hydrogen sulfide concentrations in the Albany South End community.

The data from both the formaldehyde and hydrogen sulfide background monitoring studies will be available on NYSDEC's website and will share with Albany South End community leaders. NYSDEC will conduct follow-up activity if the results from the sampling for these two contaminants indicates levels of concern.